



Contents lists available at ScienceDirect

Journal of Business Research



Consumer adoption versus rejection decisions in seemingly similar service innovations: The case of the Internet and mobile banking

Tommi Laukkanen *

University of Eastern Finland, Finland

ARTICLE INFO

Article history:

Received 1 October 2014

Received in revised form 1 November 2015

Accepted 1 January 2016

Available online xxxx

Keywords:

Consumer resistance

Adoption

Rejection

Service innovation

Internet banking

Mobile banking

Logistic regression

ABSTRACT

This study posits that all innovations meet consumer resistance, and overcoming this opposition must occur prior to product adoption. Factors driving service innovation resistance remain unclear. To better understand this behavior, the present study examines how five theory-driven adoption barriers—usage, value, risk, tradition, and image—as well as three consumer demographics—gender, age, and income—fluence consumer adoption versus rejection decisions in Internet and mobile banking. Data from two large nationwide surveys conducted in Finland ($n = 1736$ consumers) test hypotheses using binary logit models comparing mobile banking adopters versus non-adopters, mobile banking postponers versus rejecters, and Internet banking postponers versus rejecters. Study results find that the value barrier is the strongest inhibitor of Internet and mobile banking adoption. In addition, the image barrier slows mobile banking adoption, and the tradition barrier explains the rejection of Internet banking. Gender and age significantly predict adoption and rejection decisions. The results demonstrate notable differences between these seemingly similar service innovations.

© 2016 Elsevier Inc. All rights reserved.

1. Introduction

Developing Internet and mobile technologies provide innumerable service innovations for consumers. These diversifying services are increasingly important for companies trying to create a competitive advantage in the market, retain their customer base, and cut costs. However, most innovations face resistance from the market, delaying or even preventing adoption. Nevertheless, the innovation literature largely demonstrates a pro-change bias—innovations are always good, improvements over existing products or services, and consumers always want to adopt the newest products and services (Ram, 1987; Sheth, 1981). Consequently, the innovation literature predominately restricts inquiry to adoption and diffusion perspectives (Gatignon & Robertson, 1985, 1989; Ram, 1987; Talke & Heidenreich, 2014). Research investigating customer resistance to innovations remains surprisingly scarce (Kleijnen, Lee, & Wetzels, 2009). To date, little research examines the factors inhibiting the adoption process or causing rejection behavior. Consequently, the barriers consumers feel towards innovations require further study (Anticoco & Kleijnen, 2010).

While “innovation” means a product or service that a consumer perceives as new, “innovation resistance” refers to “resistance offered by consumers to changes imposed by innovations” (Ram, 1987, p. 208). Understanding resistance to innovations is important because many

businesses face a high production failure rates that stem from consumer resistance (Ram & Sheth, 1989). Firms therefore need to understand the different consumer resistance drivers to reduce product failure (Ram, 1989) and to develop measures to boost adoption rates (Talke & Heidenreich, 2014).

Current literature relating to innovations arguably falls short in at least four other research areas. First, the mainstream research into technology adoption and acceptance involves technology implementation and use in the workplace (Davis, Bagozzi, & Warshaw, 1989; Rogers, 1983; Venkatesh, Morris, Davis, & Davis, 2003), and the consumer's view receives less attention (Ferreira, da Rocha, & da Silva, 2014). Second, prior innovation research appears to overlook service innovations and focusing on tangible products (Bitner & Brown, 2008). Advancing understanding of service innovations is vital, as services represent a large share of current academic activity and growth potential in most countries (O'Cass, Song, & Yuan, 2013). Indeed, Lusch and Vargo (2006) suggest that service embeddedness makes a case for further investigation into service innovation. Third, the literature disregards demographics' role in consumer decisions relating to service innovation and thus calls for more attention to these adopter-specific factors (Choi, Kim, & Kim, 2011; Lee, Park, Chung, & Blakeney, 2012). Fourth, prior studies argue that the service type offered plays an important role in consumers' adoption decisions (Nysveen, Pedersen, & Thorbjørnsen, 2005). While Teo and Pok (2003) suggest that studying seemingly similar innovations are still rare.

To address these research gaps, the present study answers the call for empirical research to test innovation-specific and adopter-specific

* University of Eastern Finland, Business School, P.O. Box 111, FI-80101 Joensuu, Finland. Tel.: +358 50 4387423.

E-mail address: tommi.laukkanen@uef.fi.

factors affecting consumer adoption and rejection behavior (e.g., Talke & Heidenreich, 2014). The study focuses on Internet and mobile banking service innovations that offer consumers unlimited remote access. While these service innovations appear seemingly similar, historically their adoption patterns are radically different. For example, Finland – a leading country in Internet banking adoption – has an 86% adoption rate for individual online bank usage (Eurostat, 2014), but the overall mobile banking usage rate is around 11% (TNS Gallup, 2012). However, mobile banking trends predict great potential for the service because around 30% of individuals express interest in adopting the service in the future (TNS Gallup, 2012). This evidence suggests that significant growth opportunities remain (see Shaikh & Karjaluoto, 2015).

The following section reviews the relevant literature and discusses the context of the study. Section 3 presents the research model and suggests hypotheses for the empirical study. Section 4 discusses the method and presents the study's data. Section 5 presents the results. Finally, Section 6 provides discussion, and Section 7 draws theoretical implications and proposals for management practices.

2. Theoretical background

2.1. Adoption, postponement, and rejection

The innovation diffusion literature recognizes two research streams. The first stream focuses on innovation adoption and originates with Rogers's (1983) seminal work and innovation acceptance (Ajzen, 1991; Davis et al., 1989). The other stream calls attention to consumer resistance to innovations (Ram, 1987, 1989; Ram & Sheth, 1989; Sheth, 1981). Although understanding adoption behavior is important, identifying adoption barriers arguably represent a greater opportunity for practitioners. Few new products and services become commercially successful, superior innovations (Woodside, 1996) and a main cause for failure is consumer resistance (Ram & Sheth, 1989).

Surprisingly, few studies focus on non-adopters' resistance behavior. Szmigin and Foxall (1998) identify *postponers*, who may find the product acceptable, but they postpone the adoption, and *rejecters*, who do not intend to adopt the innovation. While adoption postponement suggests future intention, rejection terminates the innovation decision process. The consumer behavior literature identifies actual system usage and behavioral intention as the two most essential dependent variables (Wu & Du, 2012); however, research focuses primarily on intention (Straub & Burton-Jones, 2007). Consequently, Wu and Du (2012) argue that usage is certain and behavioral intention is not a good substitute. Surprisingly, few scholarly articles focus on both behavioral intention and actual usage behavior. The current study's contribution includes focusing on actual adopters versus non-adopters, as well as on non-adopters who postpone their final adoption decision, versus those who reject the innovation.

Rejection only represents a consumption decision at a given time and should not be viewed as a derogatory characteristic of an individual. This distinction is important, as marketers can influence future behavior by understanding and reacting to the rejection drivers (Ram, 1989). Regarding postponers, adoption only begins after consumers overcome their initial resistance (Ram, 1987). The literature exploring individuals' interactions with new technologies posits that consumers simultaneously express both favorable and unfavorable views about the innovations (Ferreira et al., 2014); resistance and adoption can coexist over the innovation's lifetime (Ram, 1987, 1989). This behavior relates to Rogers's (1983) post-adoption phase when individuals or other decision-making units discontinue using an innovation after the adoption decision. This phenomenon refers to the literature on post-adoption behavior and the continuance/discontinuance decision (Choi et al., 2011; Huh & Kim, 2008). These findings imply that innovation resistance is a normal consumer response towards innovations.

The recent literature distinguishes between active and passive innovation resistance (Heidenreich & Spieth, 2013; Talke & Heidenreich,

2014). The present study focuses on active innovation-specific consumer resistance. Initially, scholars explain this phenomenon through two constructs: habit or satisfaction with an existing behavior, and perceived risks associating with innovation adoption (Sheth, 1981). Ram and Sheth (1989) further divide consumer resistance into five distinct barriers: usage, value, risk, tradition, and image.

2.2. Adoption barriers

Usage, value, and risk are functional barriers. Ram and Sheth (1989) propose that the *usage barrier* occurs when an innovation is incongruent with existing workflows, practices, or habits. The usage barrier could relate to the service's usability and necessary changes from the consumers' perspective (Laukkanen, Sinkkonen, Kivijärvi, & Laukkanen, 2007). This behavior relates to the concept of ease-of-use in the Technology Acceptance Model (TAM) (Davis et al., 1989). Furthermore, perceived ease-of-use closely parallels the concept of complexity (Teo & Pok, 2003), which Rogers (1983) defines as the degree to which people perceive an innovation as being difficult to understand and use. This cognitive effort required to adopt an innovation generates resistance (Ram, 1989).

The *value barrier* derives from an innovation's performance and monetary value compared to alternatives (Ram & Sheth, 1989), relates to TAM's perceived usefulness and Rogers's (1983) relative advantage, and suggests that an innovation must be superior to replace an existing product (Ferreira et al., 2014). Ram and Sheth (1989) argue an innovation must offer superior performance-to-price to the alternatives for consumers to change their current behavior.

The *risk barrier* refers to the degree of risk inherent in an innovation (Ram & Sheth, 1989). Consumers often experience doubts relating to innovation adoption in the form of different risk types. Scholars initially relate perceived risks to fraud or product quality, but with today's increasing online activity, perceived risk largely relates to the financial, psychological, physical, or social risks of online transactions (Forsythe & Shi, 2003).

Tradition and image represent psychological barriers. The *tradition barrier* comes into play when an innovation is incompatible with an individual's existing values and past experience, as well as social norms (Ram & Sheth, 1989). Consumers have routines and habits, which may be very important to them, arising from frequent use of a product or service over a long period of time (Kleijnen et al., 2009). Consumers also have social and family values and follow social norms. Behavior contrary to these values and norms invokes the tradition barrier. The tradition barrier mainly implies the disruption an innovation creates to daily routines. Conceptually, the tradition barrier relates to the concept of compatibility (Rogers, 1983).

Finally, innovations attain a certain identity from their origins, such as the product category to which they belong, their country of origin, or their brand. In the innovation resistance literature, image serves as an "extrinsic cue" which consumers base their adoption/rejection decisions (Kleijnen et al., 2009, p. 346). If consumers dislike these associations, they develop a negative image of the innovation (Ram & Sheth, 1989), creating the *image barrier*. This reasoning links to various forms of fear of computers (Kay, 1993) or towards the technology (Meuter, Ostrom, Bitner, & Roundtree, 2003). The image barrier further relates to technology readiness (Parasuraman, 2000), referring to an individual's overall mental state regarding technology in general (Ferreira et al., 2014).

3. Research model and hypotheses

3.1. Usage, value, risk, tradition, and image barriers

Combining Rogers (1983) innovation diffusion model with the view of Szmigin and Foxall (1998) suggests that individuals encountering innovations must decide to adopt, postpone, or reject them. Consumers

often postpone their innovation decision until the innovation develops over time or until the innovation improves on their existing product or service (Szmigin & Foxall, 1998). The decision to reject innovations relates to a stronger, more comprehensive resistance (Laukkanen, Sinkkonen, & Laukkanen, 2008) or inertia (Woodside, 1996; Woodside & Biemans, 2005). This study proposes five adoption barriers to explain consumers' decisions to adopt, postpone, or reject a service innovation. Consequently, *adopters* are consumers who have already accept the service innovation, while *postponers* intend to postpone innovation adoption, and *rejecters* have made a decision to rebuff the innovation.

The first functional barrier is usage. Earlier literature argues that perceived ease-of-use significantly affects the intention to use mobile banking services (Lee et al., 2012). Mobile devices are small, making text and graphics more difficult to interpret and entering data more effortful compared to desktop computers (Bruner & Kumar, 2005). Some early studies on Internet banking suggest that the complexity of these services prevents some consumers from adopting them (Kuisma, Laukkanen, & Hiltunen, 2007). Moreover, some studies highlight the importance of having simple authorization mechanisms in Internet banking due to carrying a code card to enter authorization codes may be inconvenient for some customers (Kuisma et al., 2007).

H1_a: Usage barrier negatively relates to consumer decision to adopt mobile banking innovation. H1_b: Usage barrier negatively relates to mobile banking non-adopter's intention to use the innovation. H1_c: Usage barrier negatively relates to Internet banking non-adopter's intention to use the innovation.

The value barrier is the second functional barrier. Research results indicate that the relative advantage of an innovation positively correlates with the adoption rate (Agarwal & Prasad, 1997). The early literature also shows the significant effect of perceived usefulness, which relates to relative advantage on the intention to use (Davis et al., 1989). Some evidence shows this problem also exists in mobile banking (Lee et al., 2012), and in Internet banking (Alsajjan & Dennis, 2010). Brown, Cajee, Davies, and Stroebel (2003) demonstrate that a greater the perceived advantage of mobile banking over other ways of banking leads to a higher likelihood of a consumer adopting the innovation. One advantage is the ability to check account balances and transactions wherever the user might be, increasing the customer's feeling of control over their financial affairs in both mobile (Laukkanen & Lauronen, 2005) and Internet banking (Jayawardhena & Foley, 2000). However, an innovation not offering greater performance than existing alternatives unlikely changes consumers' behavior (Ram & Sheth, 1989).

H2_a: Value barrier negatively relates to consumer decision to adopt mobile banking innovation. H2_b: Value barrier negatively relates to mobile banking non-adopter's intention to use the innovation. H2_c: Value barrier negatively relates to Internet banking non-adopter's intention to use the innovation.

Perceived risks are inherent in innovations. Recent literature on banking innovations reveals that perceived risk is an important factor affecting the customer's intention to use mobile banking (Chen, 2013) or Internet banking (Martins, Oliveira, & Popovic, 2014). Cellphones, for example, have limited battery life and wireless connection may break, limiting the use of mobile services. Some consumers worry about losing the connection during their online banking transactions (Kuisma et al., 2007; Poon, 2008). Other customers fear that they themselves may make mistakes in their banking processes if they use a computer (Kuisma et al., 2007) or a cellphone (Laukkanen & Lauronen, 2005). A portable list of PIN codes poses a potential security risk, as the list may be lost (Kuisma et al., 2007). Yiu, Grant, and Edgar (2007) show a direct relationship between risk perception and adoption of online banking services.

H3_a: Risk barrier negatively relates to consumer decision to adopt mobile banking innovation. H3_b: Risk barrier negatively relates to mobile banking non-adopter's intention to use the innovation. H3_c: Risk barrier negatively relates to Internet banking non-adopter's intention to use the innovation.

Psychological barriers more often derive from conflicts with the customer's prior beliefs and values than actual usage of an innovation (Ram & Sheth, 1989). A tradition barrier may arise. For instance, consumers may perceive online banking as being very different from how they are used to paying bills (Fain & Roberts, 1997). A strong desire for personal contact with a human teller may also discourage adoption of self-service technologies (Marr & Prendergast, 1993) and outweigh the benefits of a service innovation (Dabholkar, 1996). Early studies reveal that resistance to change significantly influences customer attitudes towards using online banking (Al-Somali, Gholami, & Clegg, 2009).

H4_a: Tradition barrier negatively relates to consumer decision to adopt mobile banking innovation. H4_b: Tradition barrier negatively relates to mobile banking non-adopter's intention to use the innovation. H4_c: Tradition barrier negatively relates to Internet banking non-adopter's intention to use the innovation.

Fain and Roberts (1997) conclude that the image barrier in online banking stems from negative impressions that computers and the Internet are hard to use. Ten years later, Kuisma et al. (2007) report that some non-users of Internet banking may have markedly negative attitudes and beliefs regarding the Internet as a service channel. Nowadays, some bank customers have similar attitudes towards mobile banking. If consumers perceive new technology as being too difficult to use, they instantly form negative images of the service innovation due to the technology. This perception affects adoption and the intention to use the innovation.

H5_a: Image barrier negatively relates to consumer decision to adopt mobile banking innovation. H5_b: Image barrier negatively relates to mobile banking non-adopter's intention to use the innovation. H5_c: Image barrier negatively relates to Internet banking non-adopter's intention to use the innovation.

3.2. Consumer demographics

Demographic variables are central in predicting consumer adoption/rejection and intention-to-use decisions (Rogers, 1983; Venkatesh et al., 2003). Ferreira et al. (2014) suggest that the effect of gender, age, and income affect consumer adoption and acceptance of technological innovations.

Gender is one of the most studied consumer demographics in the electronic services context. The earlier literature suggests that men perceive online business activities as less risky (Garbarino & Strahilevitz, 2004) and view mobile commerce more positively than women (Pijpers, Bemelmans, Heemstra, & van Montfort, 2001). Some studies show a predominance of men among users of mobile banking services (Garbarino & Strahilevitz, 2004; Laukkanen & Pasanen, 2008).

H6_a: Men express a greater likelihood to adopt mobile banking innovation than women. H6_b: Male non-adopters express a greater likelihood of having an intention to use mobile banking than female non-adopters. H6_c: Male non-adopters express a greater likelihood of having an intention to use Internet banking than female non-adopters.

Prior studies often relate age to consumer attitudes towards service innovations. Previous findings show that the elderly have a lower propensity for adopting new technological services (Gilly & Zeithaml, 1985). Indeed, earlier studies (Mattila, Karjaluoto, & Pento, 2003; Laukkanen et al., 2007) argue that mature customers resist Internet and mobile banking services more than younger bank customers.

H7_a: Age negatively relates to consumer decision to adopt mobile banking innovation. H7_b: Age negatively relates to mobile banking non-adopter's intention to use the innovation. H7_c: Age negatively relates to Internet banking non-adopter's intention to use the innovation.

Income and wealth often relate to innovation adoption and diffusion. Some studies find that a lower income negatively correlates with the perceived usefulness of new technologies such as the Internet (Porter & Donthu, 2006). Earlier studies of banking service innovations

demonstrate that higher earnings influence the adoption of electronic banking channels (Mann & Sahni, 2012).

H8_a: Income positively relates to consumer decision to adopt mobile banking innovation. H8_b: Income positively relates to mobile banking non-adopter's intention to use the innovation. H8_c: Income positively relates to Internet banking non-adopter's intention to use the innovation.

4. Method and data

This study consists of two nationwide surveys conducted in Finland to empirically test predictors for mobile and Internet banking adoption versus rejection in these seemingly similar service innovations. The study uses questionnaire items from the literature. However, prior studies include very few empirical studies of innovation resistance, and validated scales for the barriers are scarce. The measurement items for the five resistance constructs (see Appendix) follow Laukkanen and Kiviniemi (2010) and apply seven-point Likert scales.

The study uses three datasets and two different data collection methods. To collect data from Internet banking, customers of a large bank operating in Finland who were either users or non-users of mobile banking were selected. The questionnaire was placed on the logout page of their online service. Lee et al. (2012) used a similar method in their study of mobile banking services. This method generated effective responses from 1089 mobile banking non-users, and 428 users (i.e., *adopters*) of mobile banking – the first sample of the present study. The second sample divides non-users into *postponers*, who intend to adopt mobile banking but have not yet done so, and *rejecters*, who claimed to have no intention of adopting mobile banking in the future. Of the non-users, 624 respondents reported that they were rejecters of mobile banking. To collect a third dataset from Internet banking non-users, the study used a postal survey. Based on a random nationwide sample, the same bank mailed 3000 questionnaires to customers who had active accounts at the bank but no Internet banking transactions in the previous six months. This procedure yielded 390 responses, a response rate of 13%, of whom 222 respondents (56.9%) had no experience of using Internet banking, 80 respondents (20.5%) had tried the service once or twice, and 83 respondents (21.3%) reported being regular users of the service. In addition, five respondents (1.3%) did not answer the question about their experience of using Internet banking services. Pre-examination of the data revealed no differences in attitudes to Internet banking between those with no experience of using the service and those who had tried the service once or twice. Therefore, these customers formed an Internet banking non-adopter group of 302 respondents, of which 219 were effective for this study after removing respondents under the age of 18 and responses with missing values. These data collection procedures therefore yielded an effective total sample size of 1736 responses. Table 1 shows the sample distribution.

Categorizing people as adopters or non-adopters is clear when based on actual usage behavior. Similarly, non-adopters were classified based on their intention to adopt an innovation. Many studies use Likert scales to measure intention to adopt, but in order to keep the analysis results comparable between the models, this study classifies non-adopters into two categories: *rejecters*, who have decided not to adopt the service innovation, and *postponers*, who have a behavioral intention to adopt the innovation in the future. The most practical tool for analyzing data with dichotomous dependent variables is logistic regression. Despite the method's practicality and advantages over many other regression and discriminant analyses, logistic regression receives little attention in marketing literature (Akinci, Kaynak, Atilgan, & Aksoy, 2007). Akinci et al. (2007) advocate the use of logistic regression in marketing research settings, such as customer-based decision-making, to provide additional viewpoints and contribute to the literature.

This study uses confirmatory factor analysis to test the convergent and discriminant validity of the theory-driven constructs. The

Table 1
Sample distribution.

Model	Variables	N	%
(I) MB adopter vs. non-adopter (n = 1517)	Mobile banking adopter Mobile banking non-adopter	428 1089	28.2 71.8
	Gender		
	Female	932	61.4
	Male	585	38.6
	Age		
	18–35 years	543	35.8
	36–55 years	687	45.3
	>55 years	287	18.9
	Income (Euros)		
	<20,000	311	20.5
	20,000–50,000	702	46.3
	>50,000	504	33.2
(II) MB postponer vs. rejector (n = 1089)	Mobile banking postponer (intention to adopt) Mobile banking rejector	465 624	42.7 57.3
	Gender		
	Female	702	64.5
	Male	387	35.5
	Age		
	18–35 years	379	34.8
	36–55 years	483	44.4
	>55 years	227	20.8
	Income (Euros)		
	<20,000	233	21.4
	20,000–50,000	511	46.9
	>50,000	345	31.7
(III) IB postponer vs. rejector (n = 219)	Internet banking postponer (intention to adopt) Internet banking rejector	142 77	64.8 35.2
	Gender		
	Female	126	57.5
	Male	93	42.5
	Age		
	18–35 years	32	14.6
	36–55 years	109	49.8
	>55 years	78	35.6
	Income (Euros)		
	<20,000	37	16.9
	20,000–50,000	135	61.6
	>50,000	47	21.5

measurement model indicates a good fit with the data, with $\chi^2 = 667.85$, df = 36, CFI = 0.96, RMSEA = 0.07. Standardized factor loadings and composite reliability values support convergent validity. The results also support discriminant validity, as the square root of AVE is greater

Table 2
Measurement model results.

Construct	Items	Standardized factor loadings	Composite reliability	UB	VB	RB	TB	IB
Usage barrier	UB 1	0.928	0.94	0.87				
	UB 2	0.939						
	UB 3	0.845						
	UB 4	0.892						
	UB 5	0.702						
Value barrier	VB 1	0.650	0.67	0.69	0.71			
	VB 2	0.764						
Risk barrier	RB 1	0.781	0.80	0.31	0.25	0.76		
	RB 2	0.861						
	RB 3	0.627						
Tradition barrier	TB 1	0.634	0.63	0.14	0.06	0.22	0.68	
	TB 2	0.714						
Image barrier	IB 1	0.701	0.78	0.52	0.39	0.54	0.29	0.80
	IB 2	0.885						
Model fit	Chi square = 667.85, df = 36, CFI = 0.96, RMSEA = 0.07 indices:							

Note: Square roots of AVE estimates are on the diagonal; correlations of the constructs are below the diagonal.

Table 3
Logistic regression goodness of fit measures.

Model fit statistics	Model I	Model II	Model III
–2 Log likelihood	1042.35	1279.10	247.53
χ^2 (df)	762.76 (5), $p < 0.001$	207.27 (2), $p < 0.001$	36.48 (4), $p < 0.001$
Hosmer-Lemeshow test	20.61, $p = 0.008$	11.51, $p = 0.174$	7.11, $p = 0.524$
Classification percentage	86.2	68.4	68.9

than the correlation with other constructs (see Table 2) (Fornell & Larcker, 1981).

5. Findings

The study tests the hypotheses with three separate logistic regression models in which the dichotomous dependent variables are: (1) mobile banking adopter vs. non-adopter (Model I); (2) mobile banking postponer vs. rejector (Model II); and (3) Internet banking postponer versus rejector (Model III). Independent predictor variables in the models are factor scores for the five adoption barriers coded as continuous variables, as well as the categorical variables of gender, age, and income. The analysis followed stepwise logistic regression with a forward conditional method. This automated process of choosing predictive items begins with no items in the model and continues by trying the items one at a time and including them in order of statistical significance. The final model does not include any statistically non-significant items.

A highly significant χ^2 ($p < 0.001$) indicates a good fit with the data in all three models (Table 3). Non-significant ($p < 0.001$) results for the Hosmer-Lemeshow test in Models II and III indicate a good fit. However, the Hosmer-Lemeshow test suggests that Model I does not fit the data ($p = 0.008$). This result is likely due to the large sample size ($n = 1517$), as the test is sensitive to large samples. Further, the models seem to accurately predict the phenomenon, as the classification accuracies are 86.2% (Model I), 68.4% (Model II), and 68.9% (Model III).

The results of Model I show that the value barrier ($p < 0.001$) is the greatest impediment to mobile banking adoption, followed by the image barrier ($p = 0.003$). In addition, gender ($p < 0.001$) and age ($p = 0.04$) significantly affect mobile banking adoption decisions. Thus, the results support hypotheses H2_a, H5_a, H6_a, and H7_a. Taking a closer look at the odds ratios, the results show that men are nearly twice as likely [$\text{Exp}(\beta) = 1.89$] as women to adopt mobile banking.

Similarly, mature users (55+ years of age) and those aged 36–55 are less likely to be adopters than 18-to-35-year-olds, the odds ratios being 0.54 and 0.83 respectively. This result means that the odds of the youngest segment adopting mobile banking are 1.85 (1/0.54) times greater than the odds of the mature segment adopting the service.

Model II again suggests that the value barrier ($p < 0.001$) is the strongest inhibitor of consumer intention to use mobile banking services. In addition, gender has a highly significant ($p = 0.001$) effect: men are 1.59 times more likely than women to be postponers rather than rejectors. The results therefore support H2_b and H6_b. With regard to Model III, the value barrier ($p < 0.001$) and tradition barrier ($p = 0.035$) prevent Internet banking non-users from adopting the service. Moreover, the respondent's age has a significant effect ($p = 0.033$), with mature users and 36-to-55-year-olds being less likely to intend to adopt mobile banking than 18-to-35-year-olds, the odds ratios being 0.27 and 0.46, respectively. Again, this finding's interpretation includes that the odds of the youngest segment intending to adopt Internet banking are 3.7 (1/0.27) times greater than that of the mature segment. Thus, the results support hypotheses H2_c, H4_c, and H7_c (Table 4).

6. Discussion

This study's goal is to investigate predictors of consumer adoption/rejection decisions in seemingly similar service innovations. As banking and other everyday services are becoming increasingly online and mobile, Internet and mobile banking service innovations provide a rich environment for study. This study assumes that all consumers resist innovations to some varying degree. The study theorizes that five adoption barriers and three demographic variables explain consumer adoption/rejection decisions in Internet and mobile banking service innovations. "Internet banking" refers to an online channel used via a computer, while "mobile banking" represents banking actions conducted via a handheld device. Three separate logistic regression models serve as a means to test the research hypotheses.

The results are interesting in light of the existing research. First, the value barrier appears to be the dominant barrier in all three models confirming Antico and Kleijnen (2010). In this vein, earlier literature directly and significantly links perceived usefulness to adoption (Yiu et al., 2007) and the intention to use Internet banking (Cheng, Lam, & Yeung, 2006) and mobile banking (Lee et al., 2012), and considers perceived usefulness to have the greatest effect on a consumer's decision to adopt banking innovations (Hanafizadeh, Keating, & Khedmatgozar, 2014). However, contrary to the mainstream information systems and

Table 4
Logistic regression results.

Model/Dependent variable	Independent variables	β	S.E.	Wald	Sig.	$\text{Exp}(\beta)$
(I) MB adopter [1] vs. non-adopter [0]	Value barrier	−1.62	0.09	299.98	$p < 0.001$	0.12
	Image barrier	−0.20	0.07	9.09	$p = 0.003$	0.82
	Gender (Female) ^a					
	Male	0.64	0.16	15.27	$p < 0.001$	1.89
	Age (18–35 years) ^a					
	36–55 years	−0.19	0.17	6.45	$p = 0.040$	
	>55 years	−0.62	0.24	1.26	$p = 0.262$	0.83
	Constant	4.98	0.34	210.10	$p < 0.001$	145.67
(II) MB postponer [1] vs. rejector [0]	Value barrier	−1.08	0.09	157.05	$p < 0.001$	0.34
	Gender (Female) ^a					
	Male	0.47	0.14	10.71	$p = 0.001$	1.59
	Constant	3.96	0.35	125.30	$p < 0.001$	52.65
(III) IB postponer [1] vs. rejector [0]	Value barrier	−0.68	0.16	19.48	$p < 0.001$	0.50
	Tradition barrier	−0.31	0.15	4.45	$p = 0.035$	0.74
	Age (18–35 years) ^a					
	36–55 years	−0.78	0.52	6.83	$p = 0.033$	
	>55 years	−1.32	0.53	2.22	$p = 0.136$	0.46
	Constant	4.87	0.90	6.14	$p = 0.013$	0.27
				29.38	$p < 0.001$	129.77

^a Reference category.

marketing literature, this study finds that usage complexity and perceived risk do not explain non-adoption or postponement of Internet and mobile banking services. Second, among the psychological barriers, the image barrier hinders the adoption of mobile banking, while the tradition barrier leads to rejection of Internet banking. This result is likely due to different diffusion phases of the innovations; mobile banking is in a relatively early phase of adoption, while a large majority of bank customers in Finland use Internet banking.

Third, consumer demographics play a major role in adoption/rejection decisions in these service innovations. Age and gender appear significant, while income is non-significant. This finding may be due to at least two possible reasons: First, older people are more likely to have higher incomes, which may be a reason why income does not have a significant effect on adoption and intention. Second, Finland is a country with high income equality, and consumers' consumption decisions across different income categories may not differ greatly. The results show that both gender and age influence mobile banking adoption decisions. However, for non-adopters' rejection decisions, gender explains mobile banking rejection, while age explains Internet banking rejection. Women seem to be more likely to reject mobile banking than men. This finding may derive from a result from [Riquelme and Rios \(2010\)](#), who argue that social norms (peer influence) are stronger among women than men in the adoption of mobile banking. The finding may also relate to culture. [Kivijärvi, Laukkanen, and Cruz \(2007\)](#) argue that women in Finland trust electronic services somewhat less than men do; however, the behavior is opposite in Portugal. Resistance to mobile and Internet banking appears to relate positively with the customer's age. Results show that the mature segment (55+ years old) is less likely to adopt mobile banking, and they report a lower level of intent to use Internet banking than the youngest age segment (18 to 35 years old).

7. Theoretical and practical implications

This study explores adopters, postponers, and rejecters of two seemingly similar service innovations. Recent literature criticizes scholars for focusing mostly on the behavioral intentions of consumers rather than actual usage behavior. For example, [Wu and Du \(2012\)](#) argue that behavioral intention may not predict actual usage accurately. This study explores both actual adoption behavior and intentional behavior. The results support the view that future research should focus not only on intentional behavior, but also on actual behavior in order to come up with valuable research findings.

Moreover, while most prior studies focus on positive adoption decisions and intentional behavior, customer resistance and the reasons for postponing or rejecting technological innovations receive little attention ([Kleijnen et al., 2009; Woodside, 1996](#)). Studies of consumer resistance to service innovations are scarce, and this study contributes to the earlier literature by empirically testing "the less developed concept" of innovation resistance ([Sheth, 1981](#)). The results show the adoption barriers that [Ram and Sheth \(1989\)](#) suggest are empirically valid predictors of consumer adoption, postponement, and rejection behavior. However, the current literature lacks studies that examine the antecedents of these adoption barriers. Future research could study how context-independent variables such as passive innovation resistance ([Heidenreich & Spieth, 2013; Talke & Heidenreich, 2014](#)) or cultural differences ([Shaikh & Karjaluo, 2015](#)) explain the usage, value, risk, tradition, and image barriers.

Prior research into innovations largely focuses on product innovations. This study adds to the less-studied field of service innovations and demonstrates differences between two seemingly similar service innovations. The findings support the view that the service type significantly affects consumers' adoption decisions ([Nysveen et al., 2005](#)) and the call for comparison studies between multiple service innovations. Demographic differences among individuals help explain important aspects of human decision-making. This study thus answers calls to investigate the role of demographic variables in consumer decisions relating

to service innovations ([Choi et al., 2011; Lee et al., 2012](#)). Study findings suggest that future research should pay more attention to often-overlooked demographic variables.

This study is a response to the call to respect individuals who resist change and understand the psychology of their resistance, so that practitioners can utilize this knowledge in developing and promoting innovations ([Sheth, 1981](#)). However, if marketers are unable to break down resistance, adoption slows and the innovation likely fails. Results show that the value barrier is the strongest inhibitor of innovation adoption and usage intention for mobile and Internet banking services. Findings suggest that non-users are yet to identify the true benefits of these service innovations or banks have not demonstrated them well enough. [Laukkanen, Sinkkonen, and Laukkanen \(2009\)](#) suggest two options for banks to increase diffusion of their banking innovations. Banks can either "pull" customers by actively marketing the benefits of the service innovation, or "push" consumers towards online channels by increasing service fees in branch offices. In Finland, for example, some banks increase their service fees to encourage consumer switching to self-service alternatives. Regarding the "pull" strategy, [Laukkanen and Kiviniemi \(2010\)](#) demonstrate that the value barrier falls significantly if banks offer sufficient information and guidance. Furthermore, the results show that the usage barrier is not an issue. Banks developing mobile banking services should consider approaching customers more from the perspective of service value rather than a purely technical perspective. This finding follows [Lee et al.'s \(2012\)](#) conclusions.

In addition to the value barrier, mobile banking's non-adopters demonstrate an image barrier; they are wary of new technology in general and believe that mobile banking services are difficult to use. However, new developments in mobile banking applications make the services more user-friendly and proper communication can overcome the image barrier (see [Laukkanen & Kiviniemi, 2010](#)). Further, [Ram and Sheth \(1989\)](#) suggest creating a unique image for the service. For example, banks could create an image that mobile banking is not just for banking transactions, but also an intelligent wallet that informs the user about the real-time balance of their account and their recent transaction history. Marketers could label the service as a pocket tool for taking control of everyday life and planning for the future.

A large majority of the Finnish population has already adopted Internet banking. Thus, an interest, from both managerial and academic perspectives, rises to understanding what keeps the minority from adopting Internet banking. The results suggest that, in addition to the value barrier, tradition also plays a significant role. Among the late adopters, custom and a desire to maintain the status quo appear to be strong drivers. According to [Laukkanen and Kiviniemi \(2010\)](#), even banks' information and guidance do not help in reducing the tradition barrier.

The study results reveal that the usage barrier is not an issue influencing consumer adoption/rejection decisions in Internet and mobile banking. This finding means that the relative advantage and added value of the service innovation overcome ease-of-use concerns. This result suggests that these banking service innovations are already well designed. Future efforts should focus on communicating and promoting the benefits of the services. Promotional strategies of mobile banking services should emphasize the emotional aspects of convenience instead of just the service's practical usefulness (e.g., [Lee et al., 2012](#)). Moreover, risk perception does not appear to be an obstacle to either Internet or mobile banking adoption among Finnish consumers. This finding contrasts many international studies, but confirms the results prior studies from Finland (e.g., [Karjaluo, Mattila, & Pento, 2002](#)). In Finland, people consider banks as highly trustworthy institutions and generally believe that bank customers are secure and safe.

Age affects adoption/rejection behavior. The results show that younger people are more likely to adopt Internet banking than their older counterparts. Contrary to Internet banking, gender significantly contributes to mobile banking adoption and the intention to use the service. The results predict that men are nearly twice as likely as women to

adopt mobile banking. Furthermore, age negatively relates to likelihood of actual mobile banking adoption, but this variable seems not to influence non-adopters' intentions of using the service.

Appendix A. Measure items

Construct	Measure item	
Usage barrier	UB 1	In my opinion, mobile/Internet banking services are easy to use. ^a
	UB 2	In my opinion, the use of mobile/Internet banking services is convenient. ^a
	UB 3	In my opinion, mobile/Internet banking services are fast to use. ^a
	UB 4	In my opinion, progress in mobile/Internet banking services is clear. ^a
	UB 5	The use of changing PIN codes in mobile/Internet banking services is convenient. ^a
Value barrier	VB 1	In my opinion, mobile/Internet banking does not offer any advantage compared to handling my financial matters in other ways.
	VB 2	In my opinion, the use of mobile/Internet banking services increases my ability to control my financial matters by myself. ^a
Risk barrier	RB 1	I fear that while I am using mobile/Internet banking services, the connection will be lost.
	RB 2	I fear that while I am using a mobile/Internet banking service, I might tap out the information of the bill wrongly.
	RB 3	I fear that the list of PIN codes may be lost and end up in the wrong hands.
Tradition barrier	TB 1	Patronizing in the banking office and chatting with the teller is a nice occasion on a weekday.
	TB 2	I find self-service alternatives more pleasant than personal customer service. ^a
Image barrier	IB 1	In my opinion, new technology is often too complicated to be useful.
	IB 2	I have such an image that mobile/Internet banking services are difficult to use.

Note: Internet banking users answered questions related to mobile banking and Internet banking non-users to the questions related to Internet banking.

^a Reversed scale.

References

- Agarwal, R., & Prasad, J. (1997). The role of innovation characteristics, and perceived voluntariness in the acceptance of information technologies. *Decision Sciences*, 28(3), 557–582.
- Ajzen, I. (1991). Theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211.
- Akinci, S., Kaynak, E., Atilgan, E., & Aksoy, S. (2007). Where does the logistic regression analysis stand in marketing literature: A comparison of the market positioning of prominent marketing journals. *European Journal of Marketing*, 41(5/6), 537–567.
- Alsaifan, B., & Dennis, C. (2010). Internet banking acceptance model: Cross-market examination. *Journal of Business Research*, 63(9/10), 957–963.
- Al-Somali, S. A., Gholami, R., & Clegg, B. (2009). An investigation into the acceptance of online banking in Saudi Arabia. *Technovation*, 29(2), 130–141.
- Anticic, M., & Kleijnen, M. (2010). Consumer adoption of technological innovations: Effects of psychological and functional barriers in a lack of content versus a presence of content situation. *European Journal of Marketing*, 44(11/12), 1700–1724.
- Bitner, M., & Brown, S. (2008). The service imperative. *Business Horizons*, 51, 39–46.
- Brown, I., Cajee, Z., Davies, D., & Stroebel, S. (2003). Cell phone banking: Predictors of adoption in South Africa – An exploratory study. *International Journal of Information Management*, 23(5), 381–394.
- Bruner, G. C., II, & Kumar, A. (2005). Explaining consumer acceptance of handheld internet devices. *Journal of Business Research*, 58(5), 553–558.
- Chen, C. (2013). Perceived risk, usage frequency of mobile banking services. *Managing Service Quality*, 23(5), 410–436.
- Cheng, T. C. E., Lam, D. Y. C., & Yeung, A. C. L. (2006). Adoption of internet banking: An empirical study in Hong Kong. *Decision Support Systems*, 42(3), 1558–1572.
- Choi, H., Kim, Y., & Kim, J. (2011). Driving factors of post adoption behaviour in mobile banking data services. *Journal of Business Research*, 64, 1212–1217.
- Dabholkar, P. (1996). Consumer evaluations of new-technology-based self service options: An investigation of alternative models of service quality. *International Journal of Research in Marketing*, 13(1), 29–51.
- Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 35, 982–1003.
- Eurostat (2014). Individuals using the Internet for Internet banking. (Retrieved from <http://ec.europa.eu/eurostat/web/products-datasets/-/tin00099>)
- Fain, D., & Roberts, M. L. (1997). Technology vs. consumer behavior: The battle for the financial services customer. *Journal of Direct Marketing*, 11(1), 44–54.
- Ferreira, J. B., da Rocha, A., & da Silva, J. F. (2014). Impacts of technology readiness on emotions and cognition in Brazil. *Journal of Business Research*, 67(5), 865–873.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation model with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50.
- Forsythe, S. M., & Shi, B. (2003). Consumer patronage and risk perceptions in internet shopping. *Journal of Business Research*, 56, 867–875.
- Gallup, T. N. S. (2012). *Mobile life 2012*. (Available online at URL <http://www.tnsglobal.com/mobile-life>)
- Garbarino, E., & Strahilevitz, M. (2004). Gender differences in the perceived risk of buying online and the effects of receiving a site recommendation. *Journal of Business Research*, 57, 768–775.
- Gatignon, H., & Robertson, T. S. (1985). A propositional inventory for new diffusion research. *Journal of Consumer Research*, 11(March), 849–867.
- Gatignon, H., & Robertson, T. S. (1989). Technology diffusion: An empirical test of competitive effects. *Journal of Marketing*, 53, 35–49.
- Gilly, M., & Zeithaml, V. (1985). The elderly consumer and adoption of technologies. *Journal of Consumer Research*, 12(December), 353–357.
- Hanafizadeh, P., Keating, B. W., & Khedmatgozar, H. R. (2014). A systematic review of internet banking adoption. *Telematics and Informatics*, 31(3), 492–519.
- Heidenreich, S., & Spieth, P. (2013). Why innovations fail – The case of passive and active innovation resistance. *International Journal of Innovation Management*, 17(5), 1–42.
- Huh, Y. E., & Kim, S. H. (2008). Do early adopter upgrade early? Role of post-adoption behavior in the purchase of next-generation products. *Journal of Business Research*, 61(1), 40–46.
- Jayawardhena, C., & Foley, P. (2000). Changes in the banking sector – The case of internet banking in the UK. *Internet Research: Electronic Networking Applications and Policy*, 10(1), 19–30.
- Karjaluo, H., Mattila, M., & Pento, T. (2002). Electronic banking in Finland: Consumer beliefs and reactions to a new delivery channel. *Journal of Financial Services Marketing*, 6(4), 346–361.
- Kay, R. H. (1993). An exploration of theoretical and practical foundations for assessing attitudes toward computers: The computer attitude measure (CAM). *Computers in Human Behavior*, 9, 371–386.
- Kivijärvi, M., Laukkanen, T., & Cruz, P. (2007). Consumer trust in electronic service consumption: A cross-cultural comparison between Finland and Portugal. *Journal of Euromarketing*, 16(3), 51–65.
- Kleijnen, M., Lee, N., & Wetzel, M. (2009). An exploration of consumer resistance to innovation and its antecedents. *Journal of Economic Psychology*, 30, 344–357.
- Kuisma, T., Laukkanen, T., & Hiltunen, M. (2007). Mapping the reasons for resistance to internet banking: A means-end approach. *International Journal of Information Management*, 27(2), 75–85.
- Laukkanen, P., Sinkkonen, S., & Laukkanen, T. (2008). Consumer resistance to internet banking: Postponers, opponents and rejecters. *The International Journal of Bank Marketing*, 26(6), 440–455.
- Laukkanen, T., & Kiviniemi, V. (2010). The role of information in mobile banking resistance. *The International Journal of Bank Marketing*, 28(5), 372–388.
- Laukkanen, T., & Lauronen, J. (2005). Consumer value creation in mobile banking services. *International Journal of Mobile Communications*, 3(4), 325–338.
- Laukkanen, T., & Pasanen, M. (2008). Mobile banking innovators and early adopters: How they differ from other online users? *Journal of Financial Services Marketing*, 13(2), 86–94.
- Laukkanen, T., Sinkkonen, S., Kivijärvi, M., & Laukkanen, P. (2007). Innovation resistance among mature consumers. *Journal of Consumer Marketing*, 24(7), 419–427.
- Laukkanen, T., Sinkkonen, S., & Laukkanen, P. (2009). Communication strategies to overcome functional and psychological resistance to internet banking. *International Journal of Information Management*, 29(2), 111–118.
- Lee, Y.-K., Park, J.-H., Chung, N., & Blakeney, A. (2012). A unified perspective on the factors influencing usage intention toward mobile financial services. *Journal of Business Research*, 65(11), 1590–1599.
- Lusch, R. F., & Vargo, S. L. (2006). Service-dominant logic: Reactions, reflections and refinements. *Marketing Theory*, 6(3), 281–288.
- Mann, B. J. S., & Sahni, S. K. (2012). Profiling adopter categories of internet banking in India: An empirical study. *Vision*, 16(4), 283–295.
- Marr, N. E., & Prendergast, G. P. (1993). Consumer adoption of self-service technologies in retail banking: Is expert opinion supported by consumer research. *The International Journal of Bank Marketing*, 11(1), 3–10.
- Martins, C., Oliveira, T., & Popovic, A. (2014). Understanding the internet banking adoption: A unified theory of acceptance and use of technology and perceived risk application. *International Journal of Information Management*, 34(1), 1–13.
- Mattila, M., Karjaluo, H., & Pento, T. (2003). Internet banking adoption among mature customers: Early majority or laggards? *Journal of Services Marketing*, 17(5), 514–528.
- Meuter, M. L., Ostrom, A. L., Bitner, M. J., & Roundtree, R. (2003). The influence of technology anxiety on consumer use and experiences with self-service technologies. *Journal of Business Research*, 56(11), 899–906.
- Nysveen, H., Pedersen, P. E., & Thorbjørnsen, H. (2005). Intentions to use mobile services: Antecedents and cross-service comparisons. *Journal of the Academy of Marketing Science*, 33(3), 330–343.
- O'Cass, A., Song, M., & Yuan, L. (2013). Anatomy of service innovation: Introduction to the special issue. *Journal of Business Research*, 66, 1060–1062.
- Parasuraman, A. (2000). Technology Readiness Index (TRI): A multiple-item scale to measure readiness to embrace new technologies. *Journal of Service Research*, 2(4), 307–320.

- Pijpers, G. G. M., Bemelmans, T. M. A., Heemstra, F. J., & van Montfort, K. A. G. M. (2001). Senior executives use of information technology. *Information and Software Technology*, 43, 959–971.
- Poon, W.-C. (2008). Users' adoption of e-banking services: The Malaysian perspective. *Journal of Business & Industrial Marketing*, 23(1), 59–69.
- Porter, C. E., & Donthu, N. (2006). Using the technology acceptance model to explain how attitudes determine internet usage: The role of perceived access barriers and demographics. *Journal of Business Research*, 59(9), 999–1007.
- Ram, S. (1987). A model of innovation resistance. *Advances in Consumer Research*, 14(1), 208–212.
- Ram, S. (1989). Successful innovation using strategies to reduce consumer resistance: An empirical test. *Journal of Product Innovation Management*, 6(1), 20–34.
- Ram, S., & Sheth, J. N. (1989). Consumer resistance to innovations: The marketing problem and its solutions. *Journal of Consumer Marketing*, 6(2), 5–14.
- Riquelme, H. E., & Rios, R. E. (2010). The moderating effect of gender in the adoption of mobile banking. *The International Journal of Bank Marketing*, 28(5), 328–341.
- Rogers, E. M. (1983). *Diffusion of innovations* (3rd ed.). New York: Free Press.
- Shaikh, A. A., & Karjaluoto, H. (2015). Mobile banking adoption: A literature review. *Telematics and Informatics*, 32(1), 129–142.
- Sheth, J. N. (1981). Psychology of innovation resistance: The less developed concept (LDC) in diffusion research. *Research in Marketing*, 4, 273–282.
- Straub, D. W., & Burton-Jones, A. (2007). Veni, vidi, vici: Breaking the TAM logjam. *Journal of the Association for Information Systems*, 8(4), 223–229.
- Szmigin, I., & Foxall, G. (1998). Three forms of innovation resistance: The case of retail payment methods. *Technovation*, 18(6/7), 459–468.
- Talke, K., & Heidenreich, S. (2014). How to overcome pro-change bias: Incorporating passive and active innovation resistance in innovation decision models. *Journal of Product Innovation Management*, 31(5), 894–907.
- Teo, T. S. H., & Pok, S. H. (2003). Adoption of WAP-enabled mobile phones among internet users. *Omega*, 31(6), 483–498.
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478.
- Woodside, A. G. (1996). Theory of rejecting superior new technologies. *Journal of Business & Industrial Marketing*, 11(3/4), 25–43.
- Woodside, A. G., & Biemans, W. G. (2005). Modeling innovation, manufacturing, diffusion and adoption/rejection processes. *Journal of Business & Industrial Marketing*, 20(7), 380–393.
- Wu, J., & Du, H. (2012). Toward a better understanding of behavioral intention and system usage constructs. *European Journal of Information Systems*, 21(6), 680–698.
- Yiu, C. S., Grant, K., & Edgar, D. (2007). Factors affecting the adoption of internet banking in Hong Kong: Implications for the banking sector. *International Journal of Information Management*, 27(5), 336–351.